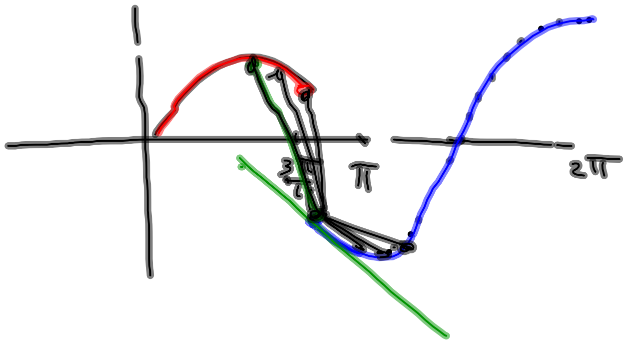
18. $f(x) = \begin{cases} \sin x, & 0 \le x < \frac{3\pi}{4} \\ \cos x, & \frac{3\pi}{4} \le x \le 2\pi \end{cases}$



Aug 31-10:07 AM

2.1a Limits

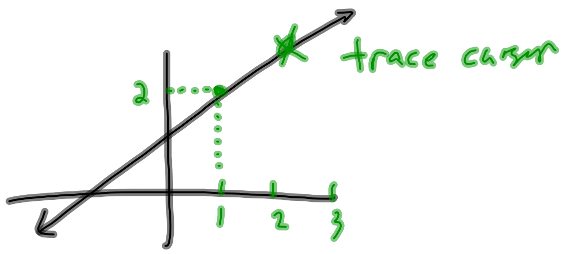
Write a sentence to explain the meaning of the following expression to someone who has not had calculus: $\lim_{h \to 0} 4 + h = 4$

as h gets closer to 0, 4+h gets closer to 4

Estimate the following limits using graphical, numerical and symbolic methods:

$\lim_{x \to 1}(x+1) = 2$

$y = f(x) = x+1$



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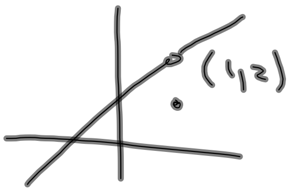
$$\lim_{x\to 0}\frac{x^2-1}{x-1} = 1$$

$$\lim_{x\to 1}\begin{cases}\dfrac{x^2-1}{x-1}, x\neq 1\\ 1, x=1\end{cases} = 2$$

plug in a value for x that is really close to 1

$$\lim_{x\to 1}\frac{x^2-1}{x-1} = \lim_{x\to 1}\frac{(x+1)\cancel{(x-1)}}{\cancel{x-1}} = x+1 \text{ if } x\neq 1$$



limit is y coord of hole

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$$\lim_{x\to 0}\frac{\sin(x)}{x} = 1$$

limit exists

$f(x) = \dfrac{\sin x}{x}$

$f(0) = \cancel{\ }$ dne

$$\lim_{x\to 0}\frac{\tan(x)}{x}$$

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$$\lim_{x \to 2} \frac{x^3 - 1}{x - 2}$$

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One-sided limits

$\lim_{x \to c^+} f(x)$ means limit as x approaches c from the right

$\lim_{x \to c^-} f(x)$ means the limit as x approaches c from the left

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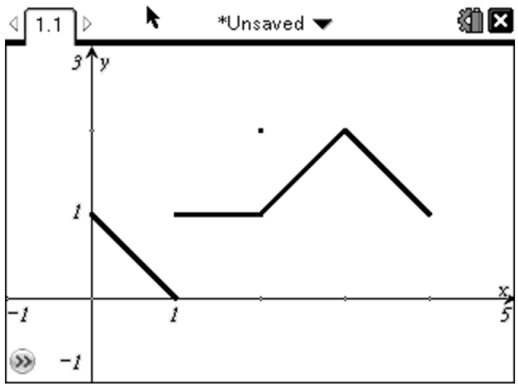
Example 8



$$\lim_{x \to 1^-} f(x) = 0$$

$$\lim_{x \to 1^+} f(x) = 1$$

$$\lim_{x \to 1} f(x) = \text{dne}$$

Aug 30-7:43 PM